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Planting and Pruning Irrigated Orchards

1915?

By Herbert Chase, Delta, Colorado

FEB 28 1915

INDEXED.

H. C. Chase

THIS is meant to be a frank, clean statement, free from technical terms; plain and understandable. It is offered without apology or halo. I expect you to read every word, including order form.

There are a lot of reliable nurserymen in this country, I know most of them; most of them are my personal friends. I will take pleasure in naming them if you wish, but I am working in the interest of my own business, which keeps me busy.

These illustrations are reproductions of photographs taken in this vicinity; I can show you the originals.

I would like a personal acquaintance with all customers; wish all might examine my plant, but that is not possible, and so I write this booklet.

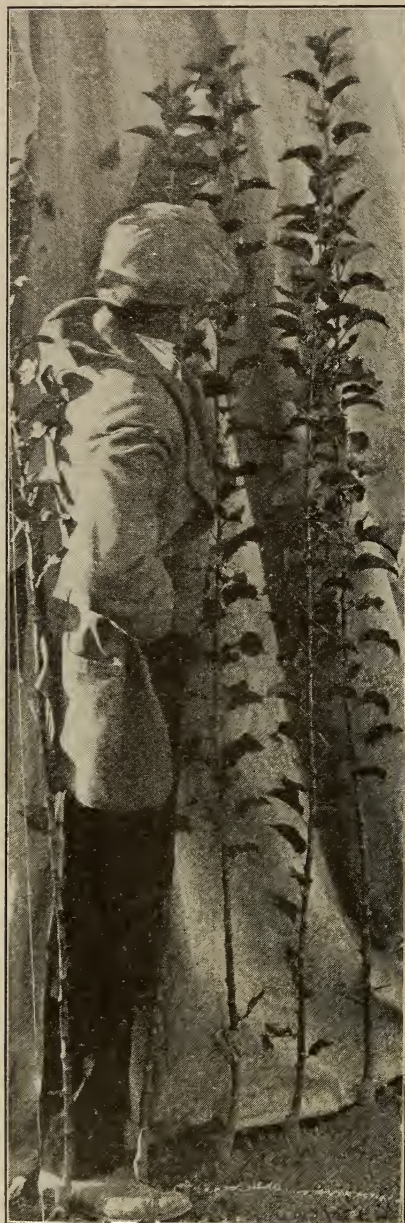
I will be glad to have you question any statement; will be glad to answer questions or give advice to the best of my ability.

Please regard this booklet as a personal letter.

Delta, Colorado

Herbert Chase.

The Reason for Nurserymen



No. 1. Picture taken Nov. 21, in my Delta nursery. Some of the lower leaves have dropped; their work is finished. No leaves were rubbed off in the nursery; as a consequence the trunks are extra heavy.

As to variety: fruit trees do not reproduce themselves from seed. A tree grown from the seed of a Jonathan apple will not bear Jonathans: a tree grown from the seed of an Elberta peach will be a peach tree, but not an Elberta. Varieties are exactly reproduced only from scions or buds. Trees grown from seeds of named sorts (as Jonathan and Elberta) are likely to be diseased. Trees grown from seeds of "wild" or "natural" fruits, are full of health and vigor, but must be budded or grafted, to produce exact varieties.

Three years are required to grow this tree, as follows:

First Year

A wild seed is planted; the little plant is called a seedling. These wild seeds are collected as follows:

Apple and Pear. The seeds are a by-product of the cider mills of Normandy. The fruit furnishing the seeds is small, very sour, and of no value, except for cider, but the finest cider in the world is made from this fruit.

Cherry. Seeds are collected in the Alsace-Lorraine country. The fruit is very small, with scarcely any flesh; it is of no value, except for the seed. Therefore, these seeds must be especially collected.

Plum. Collected in northern Italy. As in the case of Cherry, the fruit is of no value except for seed.

Peach. From the fruit of the small "natural" peach, growing wild in the mountains of North Carolina, Tennessee and Arkansas. In these sections, the fruit is sun dried for winter use. The seeds are a by-product.

Second Year

The seedling is transplanted to the nursery row. During the summer a bud is cut from a healthy tree of the variety wanted, and inserted beneath the bark of the growing seedling near the ground. In about ten days, this bud grows to, or unites with the seedling and becomes a part of the plant. The bud does not begin growth while the top of the seedling grows. Lower buds remain dormant; that is nature's way.

Third Year

Very early in spring, the entire top of the seedling (now two years old) from just above the bud (that was inserted the summer before) is cut away and the bud that has lain dormant all this time begins growth; it receives the benefit of all plant food stored within the roots the past two years. This accumulated strength, the entire energy of the plant, is given to the bud and it grows vigorously.

Thus, the top above the roots develops in one season. The tree has an extra strong body with wonderful roots. Under all conditions, this is the best tree for planting; it is the tree that will produce the finest fruit and will produce it earlier than a tree with an older top.

Nurserymen call this tree a "yearling bud," but it should not be confounded with a "yearling graft," which is grown by an entirely different process. A nursery graft is made on a bench during the winter months; it is planted in the spring and is a "yearling," ready for market, at the end of the first growing season. These yearling grafts are not as well rooted, are not as thick of body, not as vigorous.



No. 2. Closer view of the best tree.

How Trees Grow: Best for Transplanting

An established tree takes food through its roots in liquid form, from the earth. This liquid food (crude sap) goes through the sapwood up to the leaves, where the sun, light, air and the leaves evaporate a large part of the water and "work over" the crude sap, "digesting" it. The "digested" food returns to the roots through the cells of the cambium (the formative cells between the wood proper and the inner bark) building up the tree. It is this "digested" sap returning from the leaves that heals wounds and adds girth.

"The most amazing fact is that this 'too solid flesh' of the tree body was all made of dirty water and carbonic acid gas. Well may we feel a kind of awe and reverence for the leaves and the cambium. The builders of this wooden structure we call a tree."—The Tree Book, page 556.

Many think that the sap "goes up in spring" and "comes down in fall." This is an error. Sap is always in the bodies of live trees, but during the season of growth the sap is active, constantly circulating, to nourish the tree and add growth.

A newly planted tree cannot at once take food from the earth; first the roots must send out tiny "feeders" to take in the liquid food; the stem must develop leaves to help "digest" that food, and so nature stores food within the bodies of young trees to care for them during this time. This stored food starts the buds and leaves; the roots send out their "feeders," and the tree begins to gather food and strength. "—and from this stored material the early bloom and growth of spring is partly, and sometimes largely made."—Pruning Book (Bailey), page 154.

If you will lay a live, dormant tree on the floor of a slightly warm, light room, and will keep the tree from drying out, its buds will swell and leaves will grow, often bloom will develop. The food nature stored within its body to help it gather life from mother earth, is thus spent; there is no hope; that tree must die.

Never plant trees that are sprouted; sprouting uses strength the tree needs to help it gather food at a critical time. Often sprouted trees will live, but they cannot grow as vigorously as dormant trees. Sprouted trees are not merchantable.

There is no secret, no mystery, no difficulty about growing trees, but you must do a little yourself, understand—DO A LITTLE. Nature wants your help, she is entitled to it; it is fun, it is easy, it will do you good. Get in tune, use sense, go by the book.

Many trees are planted poorly, but through nature's care some of them live. Nature cannot care for all neglected trees, and so many die.

John Muir says, in "Our National Parks," page 373: "Any fool can destroy trees."

Many planters think all leaves and limbs that start along the stem of a newly planted tree should be rubbed off up to 15 or 18 inches above

the ground, the idea being to "throw the strength to the upper branches." This is not best, for the following reasons: the tree was just planted; it has no strength to "throw," except what nature stored within its body while it was growing in the nursery; it is struggling for life; is getting ready to draw food from the earth; it needs the help of the leaves to gather food and protect its body from sun scald. At the time of planting you cut away (see directions, pages 10 and 11, refer to cut No. 4) the top to reduce the leaf surface to what the tree could support; if now you rub leaves off you weaken the tree; you are not likely to kill it, but if you will let the leaves grow, the upper branches will be stronger, the trunk thicker, the tree will have more roots, all because of help of the leaves.

In the spring of 1912, five fruit growers in different parts of this county each planted ten trees as an experiment to demonstrate this statement. At the time of planting, I measured the thickness of each tree. During the season of growth, five trees from each lot were rubbed down, five were not rubbed. At the end of the growing season, I measured the thickness of all and give the figures below. This is a fair test:

Lot 1. Alfalfa soil thoroughly prepared; work done in the best manner:	
Trees rubbed increased	12½ %
Trees not rubbed increased	64 %
Lot 2. New ground not well fitted. The only plowing was a strip about 8 feet wide for the tree rows:	
Trees rubbed increased	14½ %
Trees not rubbed increased	45½ %
Lot 3. Planted in old orchard ground:	
Trees rubbed increased	23 %
Trees not rubbed increased	36 %
Lot 4. Planted in well prepared ground:	
Trees rubbed increased	45 %
Trees not rubbed increased	50 %
Lot 5. Trees rubbed increased	
Trees not rubbed increased	1025 %
	1315 %

Prof. L. H. Bailey says, in his Pruning Book, page 14. "The more active and efficient the root, the larger the top." Page 17, "The growth of the roots is, therefore, largely determined by the amount and vigor of the top or leaf-bearing portion."

If you rub all leaves off as they appear, the tree will die. If you rub all leaves from any branch, that branch will die.

Watch your trees; if a lower branch grows out of proportion, say 8 inches long, pinch out the tip (see cut No. 6, page 11). That will check the growth, but gives the tree the benefit of the leaves.

One man said to me: "Oh, but if I rub 'em off, there will be no scars; my young trees will look smoother." He spoke the truth. Another man said, "But think of the work and expense of cutting off those little shoots next spring. I can rub 'em off cheaper." He also spoke the magic words of truth. But neither of these men planted trees to "look smoother" the first year, or to "rub 'em off cheaper." If you rub 'em or cut 'em, there will be no scars at the end of the next growing season.

I assume you plant trees to live and grow; to bear fruit to be sold out in the big world, where good fruit is wanted, where the supply is never equal to the demand, and where the best always sells for high prices.

PLANTING AND PRUNING IRRIGATED ORCHARDS

Selling fruit trees with tops 3 and 4 years old originated "down East"; then all trees were sold through agents; the agent wanted "talking points," and so he talked about "large trees of bearing age" and gave the impression that old trees would bear early; they looked more like a bargain; they filled the eye. The buyer, not knowing about such things, naturally thought them the best, and so it is to this day. Many men wonderfully intelligent in their own business, think old trees are better; think an old tree will live easier and bear sooner, while exactly the reverse is the case.

In New England today, the men who pay attention to the business of orcharding, do not think as the men of one hundred years ago thought. Last spring, I sent Mr. J. H. Hale of Connecticut (one of the greatest fruit growers in the world, and an authority on horticultural subjects) a sample of the trees we plant here, and asked what the feeling in New England was today, and what he thought of such trees, compared with older ones. He wrote me ours were "best always."

Trees 20 to 30 years old may be transplanted to live, but that is not a profitable business, and only men who wish to gratify a whim and who are willing to pay richly, do such things.

I know of men on Long Island, N. Y., who have paid Isaac Hicks & Son, Westbury, N. Y., \$1,000 each for moving large, old trees; they wanted that particular tree, and were willing to pay the price. Hicks could transplant an apple tree 30 years old, and if Hicks did the work, the tree would live, because Hicks has the equipment, the knowledge, the earnestness, and he does his work the best he knows. Such trees are taken up in mid-winter with a ball of earth frozen about the roots. The cost for transplanting is \$1,000 to \$1,500 each. Thus, old trees can be transplanted and will grow, but if you expect to plant for profit; if your fruit is to find a market on merit; if you like to eat a good apple of your own growing; and if you would like to have some fruit to sell reasonably soon, plant young trees. Trees with 2 or 3-year-old tops are better than trees 20 to 30 years old, but a first-class "yearling" budded tree, as shown on page 3, is better than any other.

"Trees of one year's growth from the bud are to be preferred."—
Cyclopedia of American Horticulture, page 1247.

I am frequently asked if it is advisable to use old trees for replanting in places where trees planted one to five years before failed to grow. Under all conditions my answer is, plant the best "yearling" budded tree, there is no exception. If the older tree is best for replanting, it would have been best for the original planting.

The fact that trees have tops 2, 3 or 4 years old, is against them.

Consult any authority on this question. Ask advice of any of the agricultural experiment stations, whose addresses follow:

California	Berkeley
Colorado	Fort Collins
Idaho	Moscow
Montana	Bozeman
New Mexico	Agricultural College Station
Oregon	Corvallis
Utah	Logan
Washington	Pullman

or write the Department of Agriculture, Bureau of Plant Industry, Washington, D. C., and ask for Farmers' Bulletin No. 482. All this is free for the asking; the advice is from well-known men of authority; men who are dependable; go by what they say, profit by the benefit of their knowledge, then thank God for the privilege of living in such a country.

I am often asked if "home grown" trees are hardier than others. Folks who tell you they are, simply cater to your conceit, ignorance or "suspensions."

It is not where trees grow that make them hardy or fit for planting; variety decides the matter of hardiness, and on the nurseryman depends the reliability, condition and fitness of trees. The best trees are only grown by careful, intelligent, thorough nurserymen, who know their business and do their work the best they know. If you get the right variety grown by a nurseryman who is thorough in his work and dependable, you have the tree best suited to your needs.

All of which means, the nurseryman must have the backbone and earnestness to attend to his business when planting the seedlings and cultivating them; when cutting the buds, when inserting them, and when tying them; when digging the trees; when caring for the trees between the nursery and the packing house; when grading the trees to find defects they may have; when packing and shipping. If all of these things are done in the best way, and you have the right variety, you have the best trees, no matter where grown.

Orange trees grown in Manitoba would be no hardier than orange trees grown in Florida. Gooseberry bushes grown in Florida would be as hardy as gooseberry bushes grown in Manitoba, but the facts are, it is as difficult to grow oranges in Manitoba as it is to grow gooseberries in Florida, and all because that is nature's way.

If you have a thorough, earnest, dependable nurseryman in your neighborhood, get your trees from him, but send any distance to a reliable, earnest nurseryman rather than use trees from a nearby man who may not be just as thorough.

Branch Express Office in My Packing House During the Shipping Season. Shipments will be made correctly and promptly; no delay.

Freight and Express Prepaid. I prepay freight or express on nursery stock orders of \$15.00 or more.

Free Pruning Tools. For description, refer to pages 22 to 26. With each \$20.00 order for nursery stock, remittance with order, I will send free, a long handled pruner, a pair of pruning shears or a pruning saw.

Read Offer of Ten Trees Free, on reverse of order blank.

Planting and Pruning

I am indebted to the following well-known fruit growers for help in preparing these directions:

Mr. J. J. Bridges.....Palisade, Colorado
Mr. J. D. Hawkins.....Paonia, Colorado
Mr. A. L. Roberts.....Paonia, Colorado
Dr. A. E. Miller.....Delta, Colorado
Mr. C. T. Rule.....Paonia, Colorado

Prof. G. P. Weldon, Sacramento, California (formerly Fort Collins, Colorado).
Prof. Wendell Paddock, Columbus, Ohio (formerly Fort Collins, Colorado).

Also Mr. J. H. Baird, Superintendent of the Hale Orchard, Fort Valley, Ga., probably the largest and most successful peach orchard in the world.

Plant as early as possible in the spring.

Do not plant when there is frost in the ground, or in the air. If a



No. 3. Roots properly thinned and pruned for planting; they have been shortened to 8 to 10 inches; many of the fine, fibrous rootlets have been cut away; all strong roots have been cut with a slant on the under side, so that the cut surfaces will lie down.

hard freeze comes after the tree has been planted, no harm is done, but if well planted that tree will grow off earlier, faster and make a better showing than if it had been planted later in the season.

Dig the hole wider and deeper than the tree requires. Root hairs or feeders grow from the ends of the large roots; these reach out during the growing season, forming a new set of feeding roots. They should find only mellow, rich soil in all directions.

If the tree just fits the hole, its roots will meet hard walls, which the delicate root hairs cannot penetrate or feed in. If the soil is mellow, it is in condition to release plant food, the newly planted tree can begin to take nourishment promptly and will grow rapidly.

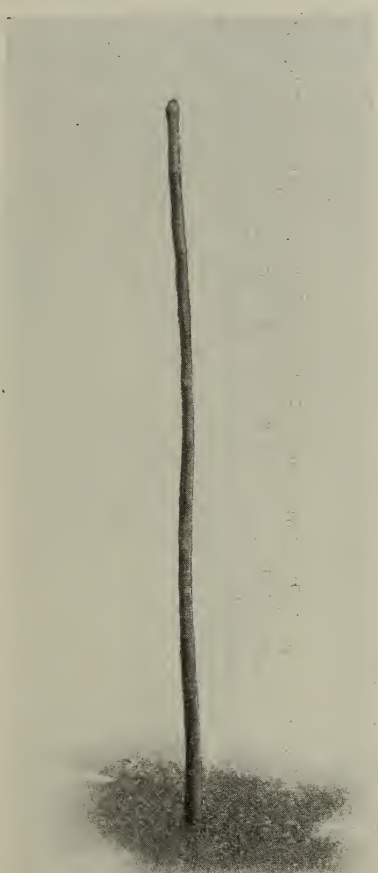
"The hole should be large enough to let the tree stand two or three inches deeper than it was in the nursery. The tree in position, fine top-soil is pushed back in the hole and worked in about the roots. With the roots well covered with fine soil and the soil slightly tramped, the water is turned into the furrow. After a thorough watering, fresh soil is thrown about the tree, and the furrow is left open for a second watering ten days or two weeks later."—Fruit-Growing in Arid Regions, page 52.

"Trees planted in fall (in arid regions), do not become well established, and in the dry winters the roots are unable to supply moisture as rapidly as it is being transpired from the top. As a consequence, the tree often dries out to the extent that it lacks the vitality to make a good start in the spring."—Fruit Growing in Arid Regions, page 48.

Manure. Manure should never come in direct contact with the roots of trees. Never use fresh, green manure; old, decomposed manure is rich in plant food and of great benefit.

Cover the bottom of the hole with, say, 4 inches of decomposed manure; put one inch of fine top-soil over the manure, then plant the tree. In this way the roots do not come in direct contact with manure. When the feeders push through the soil into the manure, they find material rich in plant food, but without heat or gasses.

It is impossible to plant fruit trees well with all the roots and all the tops left on the tree as it comes from the nursery.



No. 4. Properly planted and pruned back to 32 inches.

The fine rootlets, known as root hairs, are feeders. They slough off and new feeders grow from near the ends of the larger roots. Therefore, cut most of the fine roots away. If the long roots are not properly pruned, they will be cramped, will mold and rot off. Under these conditions, the tree must heal and recover; "must get over it" before it can attend to business and grow. Shorten all to 8 to 10 inches; use a sharp knife and cut with a slant on the under side—refer to cut No. 3—so that the cut surfaces will lie down. The cuts will heal quickly; will begin callousing at once and feeding roots will be sent out promptly. There will be no decay, no mold, no sickness, everything ready for business. If roots are broken, ragged or bruised, cut them off; if they remain they will mold or rot off, which weakens the tree. If part of the top is not cut away, leaves will start out over the entire top; roots are not yet established to feed those leaves. The tree will struggle for life and will probably starve; if it does pull through, it makes only a weak growth. Therefore prune the top back as shown by cut No. 4.

Replanting. Usually the dead tree is taken out when preparing to plant the new tree. This is not the best way.

The best way is to take the old tree out and dig the hole for the new tree in the Fall or Winter; the earlier the better. Dig wider and deeper than is necessary; say, 18 inches deep and 32 inches across.

At planting time, some of the holes may be half full of earth or some may be too deep; the holes must be "freshened up," *i. e.*, earth taken out or put in; the tree will be planted in earth that has been exposed to air, light, sun, snow or rain, freezing and thawing; that earth will release plant food rapidly.

At time of planting and two or three years afterwards, trees are pruned to give them the proper shape for bearing regular and heavy crops well; to enable spraying to be done effectively, etc. When trees reach bearing age, they are pruned for the purpose of enabling them to produce fruit of superior color, size and quality.

"The work of pruning should start at the time the tree is planted in the orchard. This is the critical time in the life of the tree, and neglect of pruning at that time influences the tree during its remaining years." —E. H. Favor, in *The Fruit-Growers Guide-Book*, page 181.



No. 5. Four weeks after planting. Leaves developed from the ground to the top; none are rubbed off.

"With the young orchard well grown (trees properly pruned at time of planting, properly pruned after the first and second years' growth), the pruner has probably solved the most difficult problem in pruning of the apple tree."—Fruit Growing in Arid Regions, page 117.

Apple

Prune root before planting. Refer to cut No. 3.

As soon as planted, cut the top off to desired height. Do not wait. If the top is left, it exhausts the moisture and strength from the body and roots of the tree. If you have not decided on the height, make it 32 inches. Refer to cut No. 4.

Best Time for Pruning. If you have a small orchard, delay the pruning to as near the opening of the growing season as possible, but if this cannot be arranged, prune at your convenience during the winter.

For full information, read the chapter, "Pruning Mature Trees" in "Fruit Growing in Arid Regions." There you will find authority not influenced by other interests. As you become acquainted with your trees and their habits, and learn more about your own business, you will consult that book often. Every time you re-read it, you will find new help, because you are learning all the time.

End of First Season's Growth. Refer to cuts No. 9 and No. 12.

End of Second Season's Growth. Refer to cuts No. 13 and No. 14.

Third Year. Select from two to three limbs per branch of the frame; remove the others. Cut the selected ones back to about 14 inches. The top should be carefully balanced; avoid bad crotches and limbs that cross. Sometimes it is necessary to remove one or more of the framework branches, which is allowable.

Fourth and Fifth Years. Select from one to three limbs per branch that were left the preceding year. Remove crossing limbs. Cut the selected limbs back



No. 6. Ten weeks after planting. Every leaf and branch was allowed to grow. Two lower branches are growing a little strong; the workman is pinching off the tip from one branch; this stops growth there, but gives the tree the benefit of the leaves. Top branches are much stronger than the lower branches; this is Nature's way.

to about 14 inches. From now on, the pruning should be of a thinning and topping nature.

Pruning a Bearing Tree. There is no cut-and-dried, iron-bound pattern. You will soon learn the habits of your trees; varieties of trees, like families of folks, have distinct habits. Some folks use poor whisky, others do not; some pay their debts; some fight at the drop of a hat; and, now and then, to prove the rule, there are exceptions.

Rome Beauty grows upright; prune to outside buds to help overcome that habit.



No. 7. The same variety as No. 6, planted in an adjoining orchard. Photographs of No. 6 and No. 7 were taken the same day. No. 6 was planted three weeks earlier than No. 7. The lower leaves were kept rubbed off No. 7. Note the stronger growth of No. 6, which shows the advantage of early planting and the benefit of the leaves. At the end of the growing season No. 6 will be stronger than No. 7.

Jonathan grows spreading; prune to inside buds to help overcome that habit.

Get acquainted with your trees; the trees and yourself will profit thereby.

An old apple tree in full bearing should be carefully pruned, every year removing nearly as much wood as is produced the preceding year, with care to keep the tops open, balanced, and free from crossing or rubbing limbs. Always cut back to the branch. Never leave a long stub unless water sprouts are desired.

Do not allow your trees to grow so that branches 3 to 4 inches in diameter must be cut out, because then large wounds have to heal or will be exposed. Often such wounds will not heal.

If the tree was properly pruned when young, you will have no difficulty in keeping the matured tree in proper shape.

Distances

There is no fixed rule. Every man has his own ideas and must decide for himself.

Upright growers, like Rome Beauty, may be planted closer than spreading growers, like Jonathan.

Do not plant too close; 25x25 feet is close enough; many of the best growers in this section plant 25x30 feet, *i. e.*, rows running north and south, 30 feet apart, trees 25 feet apart in the row. This arrangement takes advantage of the sunlight, which gives the fruit intense color.

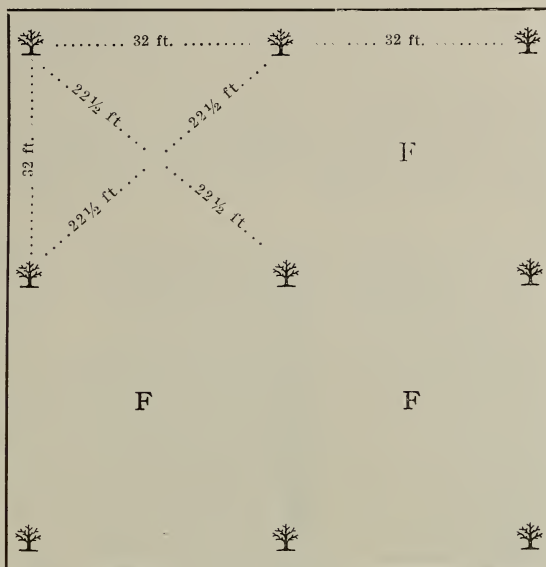
Fillers. Do not use Peach trees as fillers in an apple orchard, because peaches require different treatment as to irrigation and spraying. Peach trees should not be irrigated after the fruit is picked, unless very late in the season just before freezing up.

"Apple trees may be watered more freely than peaches, and pear trees will stand more water than apple trees. The second season is the critical time for irrigating in the growth of the young orchard, and unless sparingly irrigated and properly matured, it may be seriously



First Year. End of growing season

No. 9. Twenty-six weeks after planting (end of first growing season). Twelve branches developed, measuring 261 inches; no limbs were removed; the tree had the benefit of the leaves, which helped to develop roots. Thus, the tree received all the nourishment Nature could provide. It grew vigorously, making foundation for the very best orchard tree.



No. 8. Diagram shows distances and location of fillers.

injured in severe winter."—Fruit Growing in Arid Regions, page 211.

If fillers are to be used in an apple orchard, select a variety of apple that bears early and grows upright, instead of spreading. Rome Beauty and Wealthy make good fillers. A good plan for such a planting is to plant the permanent trees of a spreading variety (as Jonathan, Gano, etc.,) 32 feet apart each way, and the filler an upright grower, in the diamond. Refer to diagram No. 8. This shows permanent trees 32 feet apart, and fillers $22\frac{1}{2}$ feet from the nearest tree. After 12 or 14 years, the spreading trees will require all the room, and the fillers will have borne many profitable crops and can be cut out.

Number of Trees Per Acre at Different Distances

25x25 feet.....	70 trees to acre
25x30 feet	58 trees to acre
30x30 feet	50 trees to acre
32x32 feet.....	42 trees to acre
32x32 feet, with fillers (as per diagram).....	84 trees to acre

Apricot

Follow directions for Peach.

Cherry

There are two distinct types or classes, Heart and Bigarreau, and Duke or Morello.

The Hearts, or Bigarreus (refer to cut No. 10), are large growing trees with large leaves and large fruits. These are often called "Ox-Heart" and "Sweet" Cherries. The young nursery trees grow straight



No. 10. Heart or Bigarreau Cherry.



No. 11. Duke or Morello Cherry

and strong without branches. At time of planting, the root should be pruned the same as apple. The top should be cut off 32 inches above the ground.

Dukes, or Morellos (refer to cut No. 11), are smaller growing trees, with smaller leaves and smaller fruits. These are frequently called "Sour" Cherries. The young nursery trees branch as shown by illustration. At time of planting, prune the roots the same as apple and cut off about one-half the length of the branches, as indicated by illustration, always leaving the center stem or leader, a little longer than the others.

**Number of Trees per
Acre, at Different
Distances**

	Trees
Sour Sorts: Per Acre	
18x18 feet.....	135
18x20 feet.....	121
20x20 feet.....	110
Sweet Sorts:	
25x25 feet.....	70
25x30 feet.....	58

Pruning Cherry

"The man who objects to pruning, vowing homage to nature, should grow cherries, for there is no fruit tree of which it may be said that nature is a more efficient pruner."
—Fruit Growing in Arid Regions, page 125.

Freight and Express Prepaid. 1 prepay freight or express on nursery stock orders of \$15.00 or more.

Branch Express Office in My Packing House During the Shipping Season. Shipments will be made correctly and promptly; no delay.

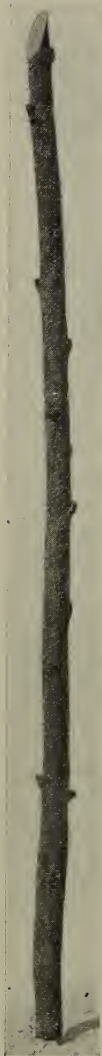
Read Offer of Ten Trees Free, on reverse side of order blank.



Tree shown in cut No. 9, after being pruned.

No. 13. After being pruned, ready for the second season's growth. For illustration, five limbs each 14 inches long were left, but most orchardists would remove limbs No. 1 and No. 2, leaving only three scaffold limbs.

No. 12.
Peach
tree properly
planted. Cut
back to 20
inches.



Peach

A tree 3 to 4 feet tall, which will have a few side limbs and some buds along the trunk is best. Peach trees 4 to 6 feet tall are not best, because their branches are too high for scaffold limbs and there are no buds on the trunk where scaffold limbs are wanted.

Roots. Prune as for the apple.

Top. Cut off 20 inches above the ground; there is no iron-clad rule; some growers prefer 18 inches. Refer to cut No. 12.

Cut off side branches smooth, close to the main stem, leaving a straight whip. The tree will develop all the side branches you want, and some to spare. Pruning to go into the second year. Keep in mind, you want trees with low, open heads. Select three or four scaffold limbs that will be most evenly distributed around the tree. Cut these off about 12 inches from the main stem. The lower scaffold limb should be 5 to 8 inches above the ground. The upper one near the top as cut off at time of planting.



Number of Trees Per Acre at Different Distances

18x18 feet.....	135 trees to acre
18x20 feet.....	121 trees to acre
20x20 feet.....	110 trees to acre
20x20 seems to be best distance.	

Pear

Follow directions given for apple, but always prune to outside buds; the trees are upright growers, and the heads should be as open as possible. Distances, 20 to 25 feet apart, square method.

Plum

Follow directions for peach, except head the trees a little higher, say 24 to 30 inches.

Second Year. End of Growing Season

No. 14. End of the second growing season, before pruning. Four scaffold limbs were left the year before.

Cross Fertilization

It is advisable to plant two sorts in the same orchard, say four rows of one variety, then four rows of another. It is a known fact that the Western Slope fruit, which has taken the blue ribbon during the last three years, was produced in orchards fertilized with the pollen of other varieties.

From Bulletin No. 181, issued by the Horticultural Division of Cornell University, Ithaca, N. Y.:

"Much of the unsatisfactory fruiting of orchards all over the country is due to self-sterility. A tree is self-sterile if it cannot set fruit unless planted near other varieties."

"The main cause of self-sterility is the inability of the pollen of a variety to fertilize the pistils of that variety."

"An indication of self-sterility is the continued dropping of young fruit from isolated trees or solid blocks of one variety."

"Self-sterility is not a constant character with any variety. The same variety may be self-sterile in one place, nearly self-fertile in another."

"The loss of fruit from self-sterility usually may be prevented by planting other varieties among the self-sterile trees."

"The pollen of some varieties will give larger fruit than that of others when it falls on or is applied to the pistils of either self-sterile or self-fertile varieties."

"Cross pollination probably gives better results than self pollination with nearly all varieties."

"It is advisable and practicable to plant all varieties of orchard fruits, be they self-sterile or self-fertile, with reference to cross pollination."

Free Pruning Tools. For description, refer to pages 22 to 26.



Tree shown in cut No. 10, after being pruned.

No. 15. After being pruned, ready for the third season. Camera not moved after taking picture No. 10. One scaffold limb was cut away because that will make a tree with a better balanced head and stronger frame.



No. 16. The vine as you receive it from the nursery.

Grapes

Plant in rows 8 to 10 feet apart and 8, 9 or 10 feet apart in the rows.

Number of Plants per Acre at Different Distances.

8x 8 feet	680	9x 9 feet	537
8x 9 feet	605	9x10 feet	484
8x10 feet	545	10x10 feet	435

Dig the holes about 2 feet wide and 15 inches deep; loosen the earth thoroughly in the bottom and throw in 2 or 3 inches of surface soil.

"Shorten the roots with a sharp knife; then spread out evenly on all sides. Fill in with pulverized earth. If the roots are not over 15 or 18 inches long, they do not need shortening, merely trimming off any ragged or broken ends.

"The hole should be dug large enough to accommodate the roots without twisting or crowding. Earth should be worked in among the roots with the fingers and pressed to them with the foot.

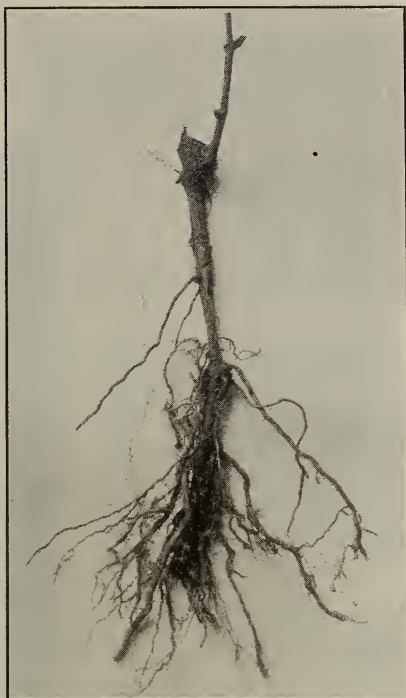
"Cut the top back to a bud just above or even with the ground. Do not leave more than two buds on any one vine, however strong the tops, or however stout and wiry the roots may be. One cane is sufficient to grow, and merely to be prepared for possible accident, both buds are left. The weaker of the two buds may afterward be removed or pinched back." (Refer to cut No. 26.)—Bushberg Grape Manual, page 43.

Cultivation. During the first summer after planting, cultivate the soil thoroughly and hoe frequently about the vines, allowing no weeds to grow. Stirring the ground frequently acts as a stimulant to growth, the finely pulverized soil forming the best kind of mulch. Peas, beans, early potatoes or other small crops may be grown between the rows the first year. It is not necessary or advisable to tie up the young canes the first summer; let them lie on the ground. In the fall, after the foliage has fallen, cut the new growth back to two or three eyes, after which plow between the rows, turning the furrows together over the rows, where there is danger of injury by freezing; make a small mound of earth over each vine, first placing a small stake near it, so that it may easily be found and uncovered in the spring. By this simple method surface drainage is effected, and the roots and tops thoroughly protected during the winter;

In the spring, as soon as the frost is out of the ground, remove the earth over the canes, and, when the new shoots are 2 or 3 inches long, rub

off all but the two strongest, which should be left to form canes, to be tied to the trellis the following spring. If to be trained to stakes, but one cane should be left. Cultivation the second summer should be the same as the first. As growth progresses, the canes may be trained along the rows on the ground, or, if the trellis is put up, they may be tied to the wires.

Pruning the Grape. It is necessary to prune in order to obtain the best fruit. Both the fruit and the shoot on which fruit is borne, grow in one season; the shoot bearing the fruit springs from wood (or "cane") of the previous season's growth. The fruit is borne in a few clusters near the base of the growing shoot. If the vine is not pruned the cane (grown the previous season) will send out a shoot from each bud; there may be eight to ten, each one of which will attempt to produce one to three clusters of fruit. The vine cannot mature such an enormous load and the crop will be a failure. Therefore prune the cane so there will be only three to five buds left; each of these buds will send out a fruit-bearing shoot the next growing season.



No. 17. Properly pruned for planting.

The time for pruning grape vines is any time from the falling of the leaves in the fall, till the sap rises in the spring.

Fruiting. The second year no fruit should remain on the vines. The third year strong vines with good culture ought to produce three to four pounds each; the following year they should produce a good crop. Care should be taken not to allow the vines to overbear, or they may be so injured as never to recover. Good vineyards often produce without injury five or six tons per acre. The less the number of clusters this weight can be put into, the more satisfactory will be the money return from the crop. Hence it is well to thin the fruit, picking off the smallest and poorest clusters.

There is always a demand for strictly fine fruit at good prices.

We do not advise summer pruning further than pinching off or rubbing out weak and useless laterals and shoots. Leaves are the laboratories of the growing vines; in them is perfected the food which produces the growth of both wood and fruit. Severe summer pruning, removing a large amount of foliage, weakens the vine, reduces the size of the fruit, retards its ripening, and checks the growth of the root. Where more than one shoot starts from a bud, it is well to rub off the weaker one before it is more than two to six inches long.

—T. S. Hubbard Company, Grape Vine Specialists.

PLANTING AND PRUNING IRRIGATED ORCHARDS

If you plant trees with tops two to four years old, the orchard will probably have many trees like these. Such trouble can be avoided by using straight, strong trees as described on page 4. Only with such trees can you develop the best orchard.

No. 18. Here are five scaffold limbs so near each other that the tree has already split open. The probability is this tree will last only a season or two more, while it should be right in its prime, and good for forty years more of profitable life.



No. 19. Here are eight scaffold limbs so near each other that they form dangerous crotches. The weight of last year's crop started a split. The probability is, another crop will kill the tree.

Spraying

The fruit grower who does not spray when necessary does not grow the best fruit or get the best returns; does not make the profit he is entitled to. There is no argument on this question.

The calyx cup of the apple remains open about 6 to 8 days (if weather is warm, it may close in 6). This is the time to make first spray for codling moth (worms). One spray may be sufficient to control them. If, however, because of previous infestation or other things, codling moth is very abundant during a season, three or more sprays may be necessary. The first is always the most important.

I do not know enough about this subject to give directions. "Fruit Growing in Arid Regions" contains a chapter, "Orchard Pests and Their Control," which is boiled down, accurate directions for spraying all fruit trees in arid regions. It will pay you to get that book and go by it.

Also write U. S. Department of Agriculture, Washington, D. C., and ask for Farmers Bulletin No. 492. It is mailed free. This Bulletin tells about the more important insect and fungus enemies of the fruit and foliage of the apple, and how to control them.

No. 20. Conditions of the apple bloom in relation to spraying for codling moth (worms).



No. 1

No. 2

No. 3

- No. 1. The bloom falling.
No. 2. Five days after the bloom has fallen. The calyx lobes are spread and in the right condition for spraying.
No. 3. Twelve days after the bloom has fallen. Young apples with the calyx lobes closed and too late for satisfactory spraying.

Free Pruning Tools. For description, refer to pages 22 to 26. With each \$30.00 order for nursery stock, remittance with order, I will send free, a long handled pruner, a pair of pruning shears or a pruning saw.

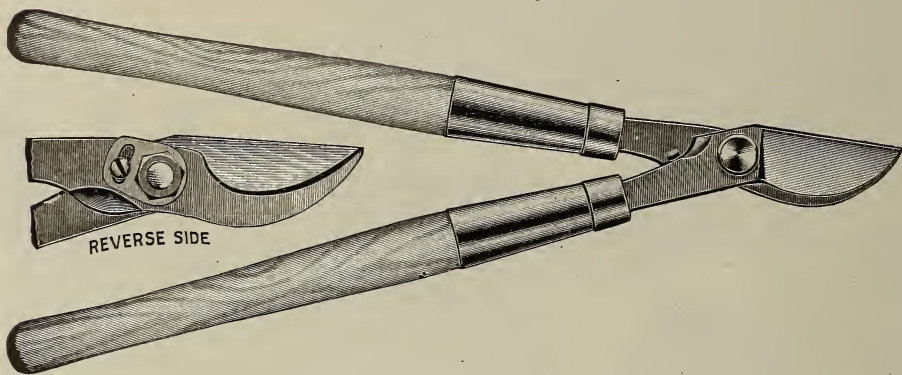
Freight and Express Prepaid. I prepay freight or express on nursery stock orders of \$15.00 or more.

Pruning Tools and Accessories

"Every pruner should be furnished with good tools. This does not mean that he must have every tool in the market, for many of them are useless. The ax and the dull saw have no place in a catalogue of pruning tools. The pruner needs a good, sharp saw, a pair of light shears, a pair of heavy shears."—Fruit Growing in Arid Regions, page 115.

Many of my correspondents are unable to find the best tools and will appreciate being able to get these. To me these seem entirely reliable. I offer them without profit, to help spread the gospel of reliability; this is an advertising dodge, wherein I offer fruit growers a premium to read what I print; to understand it, and to get acquainted with my trees—all for the mutual good. These articles sent by mail; refer to chart on page 39 for cost of postage.

Two-Hand Heavy Pruner

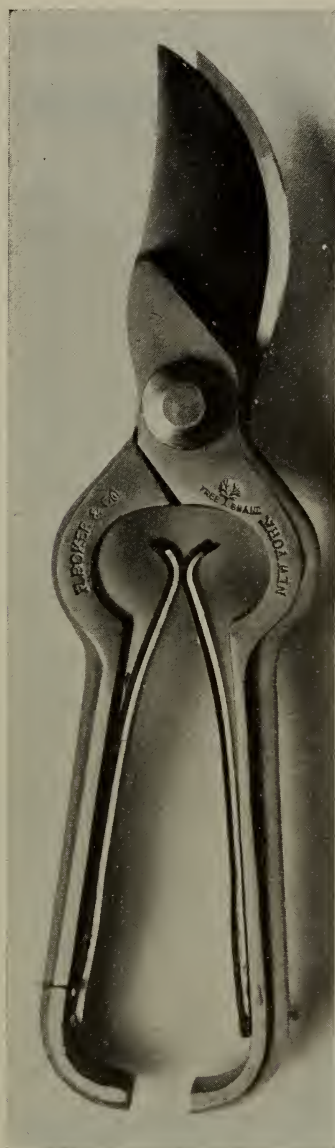


Cartright Pattern, Cronk Make

Extra Heavy (51 ounces); total length, 26 inches; usual price, \$2.50 to \$2.75. My price, \$1.35.

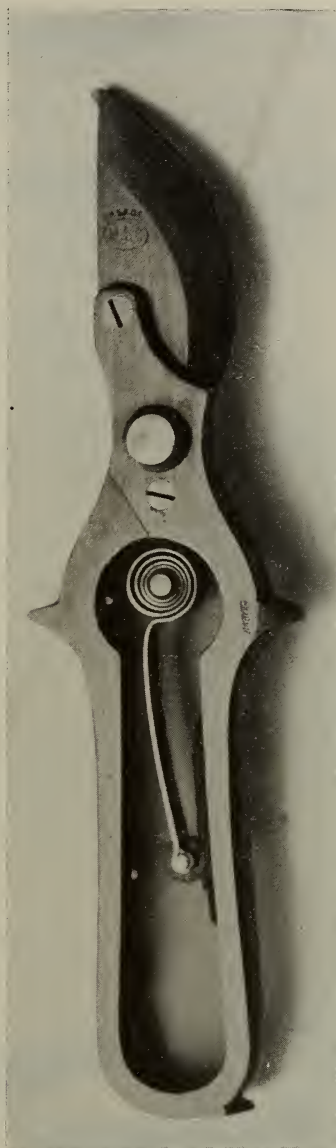
Regular (43 ounces); total length, 26 inches. Usual price, \$2.00 to \$2.50. My price, \$1.10.

Both are the same pattern, the difference being one is made from heavier material with thicker shears and heavier handles. Both are made by the Cronk people, who make six styles and grades of long-handled pruners. These are their highest priced and best; forged from high-grade tool steel; wrought iron ferrules that are especially riveted, so the handles cannot come off; has Cronk patent lock nut. I have tested this tool thoroughly and find it a high-grade, first-class article.



H. Boker Tree Brand
Shears

Usual Price, \$3.00. My Price, \$1.85.
Extra blades, 50c.
Extra springs (two halves), 25c.
(See description on page 24.)



French Shears

Usual Price, \$2.50. My Price, \$1.25.
Extra blades, 35c.
Extra springs, 25c.
(See description on page 24.)

H. Boker Tree Brand Shears

(See illustration and prices, page 23.)

Extra heavy, 9 inch; a powerful high-grade shear. Will stand heavy work. The favorite shear with experienced pruners.

Last year only one call for extra blade, no call for extra springs.

There is another "Boker" Shear on the market, made in imitation of the genuine H. Boker Tree Brand. The imitation is inferior and lower in price.

French Shears

(See illustration and prices, page 23.)

French. Nine inch, heavy; but will not stand as heavy work as the Boker. They make a clean, smooth cut, approaching a knife cut. The spring is quick and positive. This is the most satisfactory shear for nursery work. I have used it for 20 years, but in the nursery we do not have heavy pruning. This is the most satisfactory shear for work in young orchards, say, 5 years and younger, but for heavier work you will find the Boker best. The only trouble with this shear is, once in a while a spring breaks and the shear is useless until you get a new spring. I furnish the extra springs at 25c each by mail. They are easily put in place.

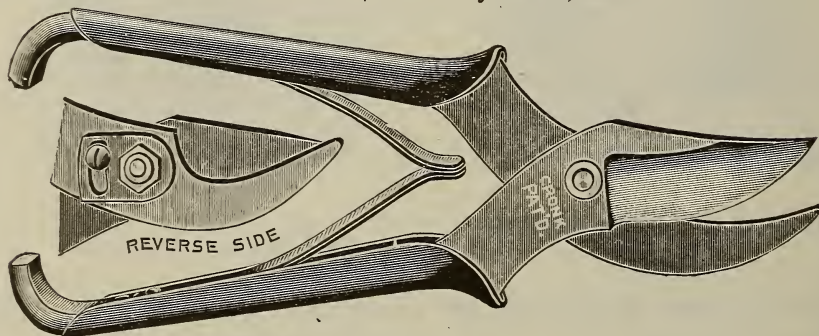
Last year only one call for extra blade, four calls for extra springs.

Extra Blades for Shears and Saws

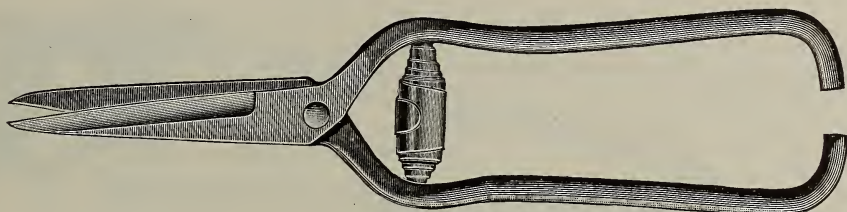
When ordering extras, be sure to specify the make of shear or saw. I handle three makes of shears, two makes of saws; unless I know exactly what you want, I cannot serve you intelligently.

Cronk Shears

Usual Price, \$1.00. My Price, 60c.



Eight inch, has lock nut. Usually sold for \$1.00, and a good shear of its class.



Grape or thinning shear, $6\frac{3}{4}$ inch; Cronk make. A standard article.
Usual Price, 40c to 50c. My price, 25c.

Thermometers

You can easily buy inferior thermometers, but often it is difficult to obtain one that is accurate. These are the celebrated Taylor Tycos, standard grade, with magnifying mercury tubes. You will find them reliable. 8-inch.

Usual Price, \$1.00. My Price, 65c.

A Valuable Book

Fruit Growing in Arid Regions. By Paddock & Whipple.

In connection with the Agricultural Experiment Station, at Fort Collins, Colorado, the authors spent several years in work and experiment in the orchards of the Western slope, the object being to help the intelligent fruit-grower. The book tells about: Pruning, spraying, altitude, irrigation, top-grafting, orchard soils, preparing land, orchard pests and their control, influence of pruning on bearing habit, and inter-planting of varieties on account of cross-fertilization.

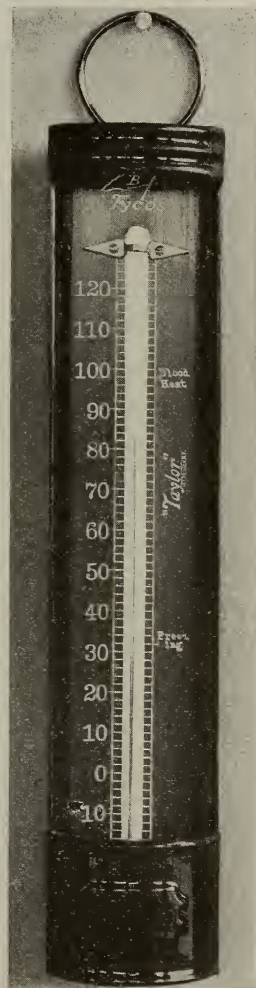
This book will be found a great help; it ought to be in the hands of every fruit-grower in the irrigated sections.

By special arrangement with the publishers, I can mail you this book for **\$1.15**, although the publishers price is **\$1.70**.

I do not carry these books in stock, but have them mailed direct from The McMillan Company (the publishers).

For Parcel Post rates on Pruning Tools and Accessories, see page 37.

Free Pruning Tools. For description refer to pages 22 to 26. With each \$20.00 order for nursery stock, remittance with order, I will send free, a long handled pruner, a pair of pruning shears or a pruning saw.



Pruning Saws

Atkins tapered frame. Length of blade 14 inches.

Frame is tapered to reach out-of-the-way

places, but is not practicable for cutting limbs thicker than $1\frac{3}{4}$ inches, because the tapered frame interferes with the use of blade at one end. Blade fastened to frame by a turnbuckle arrangement and is held rigid at any angle.

Usual Price, \$1.50; My Price, \$1.

Disston's Pruning Saw

Extra Blades 15c Each.

Usual Price, \$1.50 to \$1.75; My Price, \$1.15.

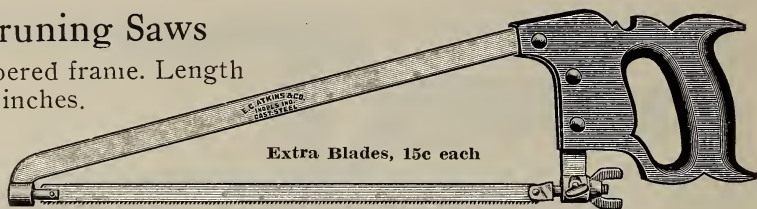
Disston's. Length of blade 14 inches; blade fastened to frame with smooth swivel; and adjusts itself to any angle while in use. The shape of the frame allows the use of the blade the entire length when cutting a large limb. Undoubtedly this is the most valuable pruning saw in use.

Grafting Wax

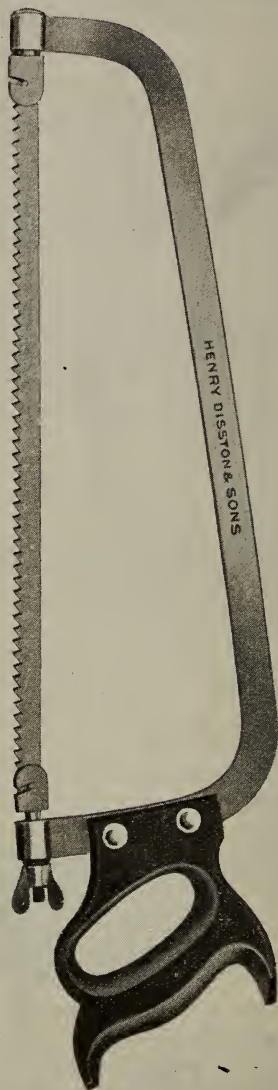
There are many kinds of grafting-wax, but the one which is the most serviceable for applying with the hands in the open air is made by melting together one part (by weight) tallow, two parts beeswax, four parts rosin. Pour a convenient portion of the melted liquid into a pail of cold water, when it immediately hardens. Take it up with the hands and pull like candy. When it becomes light yellow, it is finished, and can be made into balls and put away for future use. It will keep indefinitely. When used, the warmth of the hands will cause it to soften. When handling it, the hands should be greased with tallow to prevent it from sticking.

Or I will supply it. My price per lb., 25c.

A grafting wax to be applied with a brush and much used for kerf grafting: Raw linseed oil, 1 lb.; beeswax, 2 lbs.; rosin, 6 lbs. Boil all together.



Extra Blades, 15c each



Extra Blades, 15c each

My Business

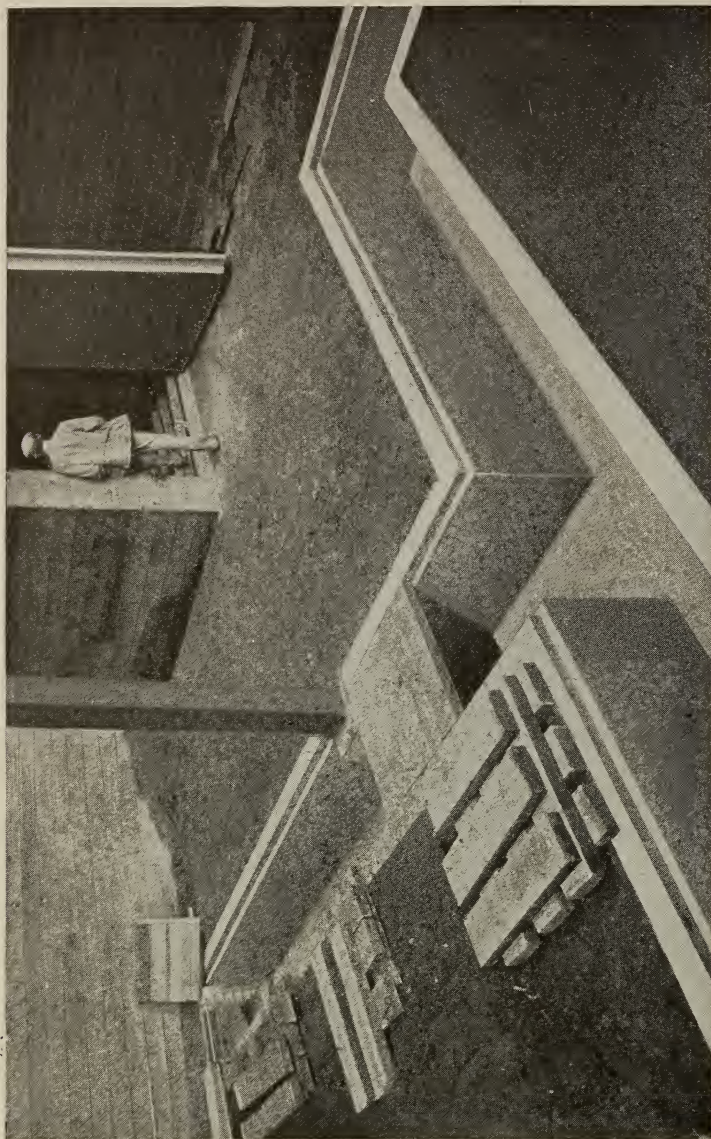
I came to Colorado in 1909. Here I grow only the leading varieties of standard fruit trees, which are sold direct to men who want the best; who want to know they are dealing with a reliable nurseryman. My trees are not sold through peddlers or tree agents.



PACKING HOUSE.

1. Windows (cannot be opened), two solid sashes with air space between. 2. Vent doors (bound with wool felt and canvas) for escape of hot air. 3. Ends of cold air ducts. 4. Office.

Before coming here to live, I thought in the irrigated sections fruit growing was handled with more thought, care and intelligence than in



Interior of packing house, looking into one of the fumigators; showing the cold air ducts (concrete) built beneath the floor level; and one of the plugs (against the wall) for closing the ducts.

the Eastern states. Since living here and becoming acquainted with conditions, I find this is so, and that planters first want to know the trees they buy can be depended on.

Since 1889 my business has been growing nursery stock, most of which has been sold in car lots to the leading nurserymen of the United States. I am well known to the nursery trade of this country, and refer to any important, reliable nurseryman.

I have built here one of the most efficient packing houses in the United States (illustrated and described on pages 27-29). This house was built to give my stock every protection it is entitled to.

Packing House

Not a cold storage, no ice, no artificial refrigeration, no fire used. Built with a series of dead-air spaces in walls and roof, which keep out heat and cold, with the addition of air-ducts beneath the floors to admit cold air (see page 28), and vent doors in the roof to allow warm air to escape. Refrigerator doors used, built from plans furnished by the Barker & Haskell Car Company, who also furnished the lever handles to force the doors air-tight.

Heat is fought without ice, cold without fire. It is well known that cold air is heavier than warm. Accordingly, if the temperature in the house is higher than wanted, the cold air ducts and vents are opened; when the air is changed and the temperature is right, ducts and vents are closed; the temperature will remain practically stationary for several days. Thus the trees (packed in spagnum moss) are held in a uniform, natural temperature, not high enough to start growth, not dry.

This house was built for the care and inspection of trees during the planting season. Trees are not kept in this house except during the planting season.

Last spring, as the season was drawing to a close, there were many mornings when, just about sunrise, the temperature inside the packing house was two degrees colder than it was outdoors, showing proper ventilation and that the house had been able to take advantage of natural conditions.

Every spring you see bundles and boxes of trees lying about depot platforms, or being inspected in the sun and wind. *My house was built* to avoid such inspection and to give trees protection until they are wanted by the planter. They are kept cool, moist and dormant. Their vitality is not impaired.

During March and April, 1911, temperatures outdoors and in the house were as follows (Taylor's and Hick's self-registering thermometers used). "Outside" temperatures taken on north wall of packing-house, away from the sun.

OUTSIDE		INSIDE	
March:	Deg.		Deg.
Average highest	60.8	Average highest	44.6
Average lowest	29.4	Average lowest	33.8
Variation	31.4	Variation	10.8
April:			
Average highest	68.1	Average highest	47.7
Average lowest	32.7	Average lowest	36.2
Variation	35.4	Variation	11.5

Trees cared for in this way are full of life and ready to start growth.

Trees should be planted early; in this section never later than the last of April, but to test the value of my house and the care given my trees, I always have some of the "left overs" planted after the season's business is closed. These experiments tell their own story.

PLANTING AND PRUNING IRRIGATED ORCHARDS

May 18, 1911. Wm. Starks, Cory, Colo., planted 50 trees, all grew.
May 22, 1912. P. H. Miller, Cedaredge, Colo., planted 175 trees; 161 grew.
May 22, 1913. I. B. Raichart, Delta, Colo., planted 35 Plum trees; 27 grew.
May 28, 1913. E. E. Bull, Austin, Colo., planted 64 trees; 63 grew.
May 11, 1914. Phil Weston, Cedaredge, Colo., planted 75 trees; 70 grew.

All were taken from the "left over" stock, simply to *test out the house and the care the trees had received*. Note the dates; trees handled in the usual way would have been dead weeks before.

Read these letters from Horticultural Inspectors.

Paonia, Colo., June 2, 1911.

If the practical orchardists of Delta County could see your packing house and the methods used there for inspecting and handling trees, they would never depend on trees that are obliged to stand inspection in the open air, exposed to sun and wind. I believe you have the most up-to-date plant for handling trees in Colorado.

L. T. ERNST, Horticultural Inspector for Delta County.

Grand Junction, Colo., Dec. 3, 1914.

After inspecting several thousand fruit and shade trees in your Delta storage house, spring of 1914, I will state: you are certainly well equipped to handle your business; your inspection and packing rooms being large, with plenty of light, gives one a chance to thoroughly inspect and pack without exposing the trees to sun or wind. This is a big advantage, as too many trees are ruined by careless handling, and this you avoid in your plant.

These are things to be considered by planters, because a good tree, well cared for, and properly planted, is sure to grow, and that is what we all want.

CARL K. RUPP,

Deputy County Horticultural Inspector for Mesa County.

Grand Junction, Colo., June 13, 1911.

I have assisted in the inspection of a number of cars of trees in your house, and have always been impressed with the precautions you take to avoid drying, or other damage to the stock. Your inspection room is so well lighted that the inspector has a chance to detect and intercept diseased trees. This fact I consider greatly to your credit, and to the advantage of your customers.

E. P. TAYLOR, Entomologist and Horticultural Inspector for Mesa County.

Row by row, my trees are as clean as any grown in the world. In digging, grading and preparing for shipment, every care is used to select only vigorous, strong trees, which are submitted to the inspectors. Sometimes an inspector finds a tree in perfect health, but lacking in something which the graders overlooked. I do not want such trees used, and ask the inspectors to throw all such out. My trees must not only be in perfect health, but in perfect condition every way.

"It is the worst kind of folly to plant a tree that has a trace of disease; not only is the tree almost sure to die before it comes into full bearing, but the infection may be spread by the cultivator, or in the irrigation water to all parts of the orchard."—Fruit Growing in Arid Regions, page 83.

My trees are not sold through agents or peddlers. They are sold for far less than trees as good can be bought through agents or peddlers, but I receive more net money for them than anyone else selling trees in this section, because you do not pay, and I do not pay, for agent's talk.

A large share of my business comes from customers of ten to twenty years' standing, or their friends. Thusly:

=====

BY HERBERT CHASE, DELTA, COLORADO

=====

Shinnston, W. Va., Sept. 6, 1912.

We are well pleased with the trees purchased from you last spring; in fact, more than pleased when compared with some we bought of another party.

If you can furnish the same quality for next season's planting, enter our order for 1,500, as follows.

LESLIE HAWKER.

Last Spring, Mr. Hawker ordered 1,200 Apple trees from me because his uncle, Henry Hawker, Cory, Colo., told him my trees were reliable and my methods decent. They now want another 1,500, and send the order to me. Why? There is nothing personal in the matter; I never saw Mr. Hawker; his uncle is an old customer and has found my trees reliable. Leslie Hawker found my trees good. If his friends are to plant trees, what will he tell 'em?

University of Kansas, Department of Latin.

Lawrence, Kansas, April 8, 1913.

I want to express my appreciation of the way you have handled my order. I do not see how you could have done more to insure the early receipt of the trees, or to keep me informed as to what you did. Thank you.

A. T. WALKER.

April 2, 1914, a year later, Professor Walker sent an order for 550 trees, and wrote: "I hope you can do as well for me as you did last year."

Stevensville, Mont., July 13, 1912.

Our president was very much surprised to see the fine growth and shape of the 4,000 trees received from you last spring. They have outgrown trees planted a year before.

J. M. ENSCHEDE.

Paonia, Colo., Sept. 4, 1912.

I began planting Chase trees twenty years ago. They have been of uniform good quality, in good condition, thus far always true to name. I give them preference.

E. J. MATHEWS.

Spring, 1911, J. P. Fargo, Yucaipa City, California, planted 400 trees from me. Spring, 1912, I received orders from the Yucaipa Valley for 3,200 trees. Spring, 1913, I received orders from the Yucaipa Valley for 11,500 trees, with the comment that my trees were "the best planted in the valley."

The above business is from high-class men who appreciate reliability; who pay their bills promptly, and are happy. These men came to me because they had faith to believe they would get reliable stock.

Aside from the satisfaction, this is real business. For final results, for permanence in business, I would rather have the influence of one such man than of all the tree agents and tree peddlers in the United States.

Because trees I send to distant states give satisfaction, I receive many orders from a distance, but a large part of my business comes from near home, Colorado, Utah and New Mexico. I can probably refer you to customers in any section of these states.

PLANTING AND PRUNING IRRIGATED ORCHARDS

TERMS. Orders are not accepted unless the purchaser is commercially responsible.

CAUTION. Orders are accepted upon condition that they shall be void, should injury befall the stock from frost, hail, storm, fire, strikes, or other causes beyond my control.

GUARANTEE OF GENUINENESS. I exercise the greatest care to keep varieties pure and true to name, and hold myself in readiness at all times to replace, on proper proof, all stock that may prove otherwise, or refund the amount paid; but it is mutually agreed between the purchaser and myself that I shall not be liable for any amount greater than the original purchase price.

GUARANTEE OF LIFE. Every spring, many trees are planted to die; they are planted in a lazy, ignorant, careless way. It has always been so, and will continue. For these reasons, I do not guarantee the life of trees. No responsible nurseryman does. That would interfere with the business of a higher Power. Planting a tree is a reverent, serious matter; earnest, honest effort is needed to obtain the best results.

I have an equipment for caring for trees in the best way; I know my business; results show my trees are good. I guarantee to deliver trees to you in perfect condition and then my responsibility ceases.



Interior of inspection room. Ample light. No sun; no wind; no frost; no evaporation. Trees handled this way are bound to give results.

Catalogue of Varieties

In the irrigated sections, brilliant sunshine and cool nights give to all fruits a deeper color. Red apples become darker; dark red apples become almost black. Most folks buy apples with their eyes and they love 'em red.

"High color usually indicates high quality for the variety, no matter where the fruit is grown."—Fruit Growing in Arid Regions, page 228.

Apples

Price: Per 100, \$15.00; Per 10, \$1.50; Each, 20c

In commercial orchards, it is advisable to plant two or three sorts on account of cross-pollination, but it is a mistake to plant more than three sorts unless you are planting more than 100 acres. Do not plant novelties and untried sorts except in an experimental way. Stick to what you know are money-makers.

Varieties are listed in their order of ripening or picking.

Early Apples

Early Harvest. One of the earliest; medium to large; pale yellow; a standard, well-known sort; valuable for home use and nearby market.

Yellow Transparent. Pale yellow when fully ripe; tender; good size; valuable for home use and nearby market.

Red June. Brilliant red; very handsome in irrigated sections; ready for market when red apples are scarce; will stand transportation of 100 miles, but should not be shipped further; sells for fancy prices when packed in half boxes.

Duchess (Duchess of Oldenburg). Valuable for home use and for markets within the nearby states.

Red Astrachan. Because it cracks badly in the irrigated sections, it is not of value. I do not propagate it.

Chenango (Chenango Strawberry). Pale yellow, with brilliant red stripes and slight blue bloom; very handsome; fine quality, tender; valuable for home use and nearby market.

Wealthy. Late fall; ready for market just before picking the main peach crop; positively the best of its season; large, almost overspread with brilliant red; very attractive; fine quality. The tree bears early and is profitable as a filler. The season of picking does not interfere with picking other fruit.

Main Crop

Listed in the order of picking.

Jonathan. A sort Colorado has made a reputation on; brilliant red, overspread with a blue bloom; of highest quality; an early bearer; one of the most profitable sorts.

My Jonathans are propagated from buds taken from blue ribbon trees in the orchard of Mr. William Ingram, Grand Junction, Colorado.

Grimes (Grimes Golden). Medium size; rich golden yellow, and in the irrigated sections takes on a blush cheek; of the highest quality; invariably sells for the high prices; rapidly growing in favor.

Banana (Winter Banana). Large; pale yellow, with blush cheek; waxy; very handsome; tender and bruises easily; requires careful handling; do not regard it as profitable to grow in a large way.

Ben Davis. I do not grow it, because it is not in demand. Its color is poor. Gano is of the same family; same habits, same quality, but a handsomer and more profitable apple. Gano takes the place of Ben Davis. Ben Davis is obsolete.

Gano (Black Ben). One of the best keepers and most profitable sorts; of the Ben Davis family; same in thrift, hardiness and productiveness; fruit no better in quality, but much handsomer, taking on a dark red; will sell for 25 to 50 per cent more than Ben Davis, and produces as much fruit.

Gano and Black Ben are sold where handsome apples are wanted. For these reasons, Gano and Black Ben are more profitable than Ben Davis.

Black Ben. Of the Ben Davis family. Many authorities say Black Ben and Gano are identical. Others say they are not. I grow the two as separate varieties, having obtained my Black Ben buds from marked trees (which produced blue ribbon fruit for the past three years), growing in the orchard of Mr. E. E. Bull, Austin, Colorado.

Delicious. Introduced and much advertised by Stark Bros., of Missouri. My stock of this variety is propagated from buds cut from the original trees planted by Fred Buol, at Cedaredge, Colorado.

Northwestern Greening. Greenish yellow; large to very large; extremely hardy and much used as a stock for other sorts.

Rome (Rome Beauty). One of the red apples Colorado made its reputation on; one of the most profitable. Dining car folks want them for "baked apples and cream, 25c" (they are worth it). In irrigated sections, Rome takes on a brilliant red and a blue bloom; one of the longest keepers and surest bearers.

My Romes are propagated from buds taken from blue ribbon trees in orchards of Mr. W. P. Heddles, Paonia.

A. L. Roberts, Paonia, Colorado, (one of the most successful fruit growers in the state) says, "Rome bears early; it is, perhaps, the most profitable for the first 8 or 10 years. The culls even find a market when there is any demand for cheap apples. My trees, 12 to 16 years old, average 16 to 20 boxes. I saw a large Rome tree at Mr. Hinman's place that produced more than 50 boxes. Often they bear a box the fourth year, but for a whole orchard it is safer to say they will average a box at 5 to 6 years."

White Winter Pearmain. One of the longest keepers; of the best quality; pale yellow, but in the irrigated sections takes on a blush cheek.

Arkansas Black. Dark red, almost black; one of the best keepers. The fruit is in great demand for Eastern and European markets, but it is not a regular bearer, and for that reason is not regarded a profitable sort.

Paragon. A seedling of the Winesap, which it resembles, but is much larger. My Paragons are propagated from a tree growing in the orchard of Mr. M. P. Gonner, Paonia, which is a distinctive strain, the fruit averaging larger, and tree a regular bearer.

Stayman (Stayman Winesap). Much larger than Winesap. In the irrigated sections it takes on a deep red; sells for a fancy price and is one of the valuable sorts. Where there is less sunshine it is a green apple covered with red stripes, not handsome, nor as desirable. My Staymans are propagated from buds obtained in the Garvin orchard, Paonia, Colo. The Staymans from this orchard have taken the blue ribbon wherever they have been exhibited for the past three years.

Winesap. Medium to small, unless thinned. When carefully thinned the fruit attains good size. Dark red; one of the sorts Colorado has made its reputation on; a good shipper and good keeper; stands rough handling; requires a deep, heavy soil, and will not succeed on some soils suited to other sorts.

My Winesaps are propagated from buds taken from blue ribbon trees in the orchard of Mr. William Ingram, Grand Junction.

Geniton (Rawles Janet). This variety buds and blooms much later than other varieties, thus escaping danger of injury from late spring frosts; it is an abundant bearer and a fairly good apple, but not high in quality and not widely planted in the irrigated regions.

Northern Spy. Not valuable in this section as an orchard tree. Because the scion of a Northern Spy graft will emit roots, the tree finally becomes established on its own roots. The variety is resistant to aphids, and for that reason makes a very valuable stock on which to topwork other sorts. For the above reasons, my Northern Spy are propagated by grafting.

Crab Apples

Hyslop. Fruit large for its class; produced in clusters; dark, rich red, covered with a thick blue bloom.

Transcendent. Golden yellow, with beautiful rich crimson nearly covering the fruit.

Apricots

Price: Per 100, \$20.00; Per 10, \$2.00; Each, 25c

Moorpark. The most valuable variety for the inter-mountain regions; of the best quality; deep yellow with red cheek; large size.

Wilson. Discovered on the Wilson (Travis) ranch, near Cory, Delta County, Colorado. Compared with Moorpark, it is seven to ten days earlier, larger, flesh of deeper color, cheek shows more red, richer quality.

Cherries

Price: Per 100, \$25.00; Per 10, \$2.50; Each, 35c

Easiest standard fruit to grow. There are two distinct classes.

HEARTS OR BIGARREAUS

(See cut No. 10)

Large-growing trees, with large leaves and large fruits; often called "Oxheart" and "Sweet" cherries. These are valuable for dessert use. There is much complaint about securing a good stand of this class of cherry trees. Three factors enter into the difficulty: trees not being dormant at planting; trees are given too much water; trees are deficient in roots. As a rule, failures can be traced to one of these causes. I bud this class on Mazzard stocks, which are more expensive, more difficult to bud, but they are the natural stock for this tree, have more fibrous roots, are safer, are best. The fruit of all sweet cherries is large in size, often measuring over an inch in thickness.

Black Tartarian. An old standard sort, one of the earliest sweets, deep purplish black.

Bing. Ripens after Black Tartarian, one of the grandest black cherries in existence, a fine, firm shipper, much grown on the Pacific Coast for Eastern markets.

Lambert. Ripens about with Bing, extra large in size, dark purple, turning almost black when ripe, fine and firm; in quality equal to Bing.

Royal Ann. Of the largest size; pale yellow, becoming amber in the shade, with bright red cheek; about a week later than Lambert.

DUKES OR MORELLOS

(See cut No. 11)

Smaller-growing trees, with smaller leaves and smaller fruits; called "sour" cherries. More valuable than the others for culinary purposes. Enormous bearers; more easily transplanted.

Early Richmond. One of the first cherries to ripen; poor quality; small; bright red. Earliness is about its only value.

Montmorency. Main crop: 10 days later than Early Richmond. The most valuable commercial cherry. The fruit is large and of fine quality; acid.

This is the cherry wanted by the great packers of the country.

Much confusion exists about the "different types" of Montmorency. In 1910, I investigated this matter for the Department of Agriculture, Washington. I found various handles added to the name Montmorency, for the purpose of attracting buyers, but that the best type was brought from France to this country by Ellwanger & Barry of Rochester, N. Y., about thirty-three years ago.

The stock I propagate is from one of the original Ellwanger & Barry trees. I know I have it right.

The demand for Montmorency Cherry fruit is greater than the supply.

Wragg. Of the English Morello type, but more valuable in the irrigated sections; large; nearly black; an enormous bearer; ripens fourteen to twenty-one days later than Montmorency.

Royal Duke. A cross between the two types, and does remarkably well in this section. By some growers in Colorado it is regarded as their most valuable cherry. Not as large as the sweet sorts, but larger than most of the others; light red, rich and juicy.

Peaches

Price: Per 100, \$12.50; Per 10, \$1.50; Each, 20c

Varieties are listed in their order of ripening.

Greensboro. Ripens just ahead of Arp Beauty; white with red cheek; semi-cling to free; unusual good quality for an early peach; good shipper.

Arp Beauty. Most valuable early Peach; free stone; rich yellow; crimson cheek; showy; good quality. The Delaware State College Farm reports under date of March 11, 1912, "present winter has been unusually severe on peach buds. Examination of buds of all varieties growing here, shows Arp Beauty as having suffered the least, having 86 per cent of living buds."

Triumph. About the same season as Arp Beauty; yellow; semi-cling to free; fair to good in quality; a royal early peach in the irrigated section.

Carmen. About 12 days later than Arp Beauty; free stone; white flesh; good quality; good shipper.

Champion. About 3 weeks later than Carmen; free stone; white flesh with blush cheek; of the very best quality.

Belle of Georgia. Follows Champion 3 to 6 days; white; free stone; fine quality and a good shipper. Judge Bell, of Montrose, says, "Belle of Georgia is the best peach of its season."

Elberta. Follows Belle of Georgia 6 to 9 days; free stone. This variety planted in a large way, produces most of the peaches shipped to distant markets; yellow with crimson cheek; the best shipping peach, and probably the most valuable peach in the world.

Pears

Price: Per 100, \$25.00; Per 10, \$2.50; Each, 35c

Bartlett. Probably the most valuable pear grown; largely planted for market.

Beurre d' Anjou. Late fall or early winter; very profitable where it succeeds.

Kieffer. Tree a strong, vigorous grower; foliage not as subject to disease as other sorts, which makes it easy to grow. An enormous bearer of large, handsome fruit of poor quality. In irrigated sections the fruit colors well and finds a market at good prices. It is one of the most profitable pears, perhaps the most profitable.

Following figures are from the records of the Grand Junction Fruit Growers' Association, Grand Junction, Colorado:

1907, 11 cars of Kieffer sold for \$10,087.12 net to the grower. Fancy 4-tier, \$2.09 per box. Choice, 4 and 5-tier, \$1.46 per box.

1909, average price realized for 4 and 5-tier, \$1.67 per box.

1910, average price realized for 4 and 5-tier, \$1.47 per box.

Remember, Kieffer is a heavy bearer. These figures show there is money in Kieffer.

Seckel. Finest quality; small; valuable for home use or nearby markets.

Plums

For nearby market or home use. Price: Per 100, \$25.00; per 10, \$3.00; each, 35c

Burbank. Large; cherry-red with slight lilac bloom; flesh deep yellow; an early bearer.

Green Gage. Small; yellowish green; of the very finest quality; one of the richest and best plums.

Italian Prune (Fellemburg). Dark purple with a blue bloom; medium size; pointed; a valuable sort for the inter-mountain region.

Satsuma (Blood Plum). Large; skin and flesh are dark purplish red; seed exceedingly small; of good quality and fine flavor; one of the best for the inter-mountain region.

Shropshire Damson. An improvement on the common Damson; larger than common Damson; dark purple; an enormous bearer; highly esteemed for preserving.

Quinces

Champion, Orange.

Price:

Per 10, \$2.50;

Each, 35c

Berry Plants, Currants, Gooseberries

All berry plants I sell are sucker or tip plants which have been transplanted to the nursery and grown one year. They are thoroughly mature to the tips; have fine roots, and as a rule, give entire satisfaction. Most berry plants sold are the sucker or tip plants that have not been transplanted; they are not well rooted, and as a rule, do not give satisfaction.

In the inter-mountain sections, berries are grown for nearby markets or for home use, and I sell only the varieties best suited to these sections.

BLACKBERRY. Strong, transplanted plants. **Eldorado.** Large, jet black, without hard core; melting, sweet, plant hardy and productive. Per 100, \$4.50; per 10, 50c.

DEWBERRY. Transplanted plants. **Lucretia.** A low-trailing blackberry. Large, soft, sweet, good quality, no hard cores. Per 100, \$4.00; per 10, 50c.

RASPBERRY. Black Diamond. Transplanted plants. Hardy and healthy. Similar to Gregg, but more prolific, more profitable, a strong grower. Where known, it is considered the best Black Raspberry. Per 100, \$5.00; per 10, 60c. Black Raspberries are harder than Red Raspberries.

Red, Marlboro. A standard, well-known sort. Light crimson, firm, good, vigorous, productive. Per 100, \$4.00; per 10, 50c. Red Raspberries are of finer quality than Black Raspberries; the plants are not so hardy, but they do well in the sheltered parts of this section.

STRAWBERRY PLANTS. I do not sell these, because when handled with wooded plants they are apt to dry out or mold, and will not give satisfaction. Buy Strawberry plants from strawberry-plant men. I will give you their address if you wish.

COLUMBUS GOOSEBERRY. A strong, robust grower; foliage large and glossy; in the inter-mountain sections it is freer from mildew than any other sort; fruit large and of the highest quality. Per 100, \$12.50; per 10, \$1.50; each, 20c.

"The Columbus Gooseberry is the top-notch here, bringing good prices and giving no trouble from mildew."—W. J. Manning, Ogden, Utah.

CURRENT. **Fay's Prolific.** Red; large berry; juicy; fine flavor. The best red currant for this section. Per 100, \$6.00; per 10, 75c. Black Currants are of little value here; do not sell.

Grapes

Concord. Black, early, strong grower, hardy, healthy and productive. Decidedly the most productive grape in America. Per 100, \$4.50; per 25, \$1.75; each, 7c.

Campbell's Early. Extra early, large, purplish black with heavy blue bloom; high quality; vine productive, vigorous and hardy; ten days to two weeks earlier than Concord; the best commercial black grape of its season; is more productive than other grapes of its season. Per 100, \$7.50; per 25, \$2.50; each, 15c.

Diamond. Light yellowish green; early, hardy. Thrives with Concord; high quality; ripens earlier than Niagara. Per 100, \$6.50; per 25, \$2.00; each, 10c.

Niagara. Light yellowish green; early; vigorous and productive; not quite as hardy as Concord. Per 100, \$6.50; per 25, \$2.00; each, 10c.

Agawam. Purplish red; follows Concord; a good keeper. One of the best red grapes. Per 100, \$6.50; per 25, \$2.00; each, 10c.

Worden. Black; a week earlier than Concord and much like it. Per 100, \$6.50; per 25, \$2.00; each, 10c.

Hardy Climbing Vine

Sent by parcel post.

Woodbine or Virginia Creeper (*Ampelopsis Quinquefolia*). A most satisfactory vine for porches, screens, etc.; frequently grows 10 to 15 feet in a season; dense foliage; makes a complete screen; does not freeze back.

Strong plants: For 10, \$1.40; for 5, 80c; each, 20c.

Shade Trees

American White Elm, 50c. Perhaps the grandest tree growing in America. The first two years it does not grow as rapidly as the others, but after becoming established, is a strong growing tree. It becomes a tall, wide-spreading tree, 75 to 125 feet high; symmetrical, vase-shaped. It needs more care in planting than the others.

Silver Leaf or Soft Maple, 50c. A rapid growing Maple, that does well in this section; easy to transplant.

Carolina Poplar, 25c. Easiest shade tree to grow, hardest to kill; will stand more trouble, discussion and neglect than any other shade tree grown here; more widely planted here than all other shade trees combined, and considering all things, perhaps the most satisfactory shade tree for the Rocky Mountain section; it has good foliage and grows rapidly, but in sections where they take pride in growing fine trees, it is regarded the poorest of all.

Do not rub leaves or small branches off the trunk the first year. Let the tree have their help, they can be cut off the next season.

At all times I shall be glad to answer questions, or give information. I should like to have an opportunity of supplying your wants in trees and plants.

HERBERT CHASE, Delta, Colorado.

COST OF POSTAGE

In some instances these figures may be a few cents high. In all such cases I will return excess postage.

	Two-Hand Heavy Pruner For 1 For 2 For 3 For 4	Pruning Shears For 1 For 2 For 4	Thinning Shears For 1 For 2 For 4	Pruning Saw For 1 For 2 For 4	Thermometer For 1 For 2 For 4	Grafting Wax, Per Lb. For 1 For 2 For 4
Local Zone: R. F. D. from Delta	\$0.07 \$0.09 \$0.13	\$0.05 \$0.06 \$0.09	\$0.04 \$0.05 \$0.05	\$0.07 \$0.08 \$0.09	\$0.05 \$0.06 \$0.06	\$0.05 \$0.06 \$0.07
Zones 1 and 2: Colorado (Western) New Mexico (N. W.) Utah (East of Helper)	.08 .12 .19	.05 .06 .09	.04 .05 .05	.07 .08 .09	.05 .06 .06	.05 .06 .07
Zone 3: Colorado (Eastern) New Mexico Utah (Western) Wyoming (Southern)	.12 .20 .36	.08 .09 .12	.04 .07 .08	.08 .09 .12	.06 .08 .08	.06 .08 .12
Zone 4: Arizona Idaho Kansas Montana Nebraska Nevada Wyoming Northern)	.19 .35 .63	.11 .15 .19	.04 .07 .11	.11 .15 .19	.07 .11 .11	.07 .11 .19
Zone 5: California Iowa Minnesota Missouri Oklahoma Oregon Washington Texas	.26 .50 .92	.14 .20 .26	.04 .08 .14	.14 .20 .26	.08 .14 .14	.08 .14 .20

Press of
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St. Joseph, Mo.

